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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/246,779 | 09/27/2011 | Saeid Azemati | F1002.10679US02 | 5498 |

97149 7590 04/25/2017

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|---|
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| ART UNIT | PAPER NUMBER |
|---|---|
| 2636 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 04/25/2017 | ELECTRONIC |

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* SAEID AZEMATI, FARHANG SAKHITAB, and JAMIE LARS SILVA

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Appeal 2016-006780
Application 13/246,779
Technology Center 2600

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Before MICHAEL L. HOELTER, BRUCE R. WINSOR, and NATHAN A. ENGELS, *Administrative Patent Judges*.

WINSOR, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants[1] appeal under 35 U.S.C. § 134(a) from the final rejection of claims 1–8, 10–17, 19, and 20, which constitute all the claims pending in this application. We have jurisdiction under 35 U.S.C. § 6(b). Claims 9 and 18 are cancelled. App. Br. (Claims App'x) 21, 23.

We affirm-in-part.

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[1] The real party in interest identified by Appellants is FINISAR CORPORATION. App. Br. 3.

## STATEMENT OF THE CASE

Appellants' disclosed invention relates to "regulation of the temperatures of multiple internal components of a TOSA [transmitter optical subassembly]." Spec. ¶ 5. More particularly, the disclosed invention relates to "[t]hermal management of a locker etalon in a transmitter optical subassembly (TOSA)." Spec. Abstract. Claims 1 and 19, which are illustrative, read as follows:

1. A transmitter optical subassembly (TOSA) comprising:

a case;

a laser positioned within the case and electro-thermally connected to the case;

a locker etalon positioned in the case and thermally connected to the case; and

a thermoelectric cooler (TEC) positioned within the case and in thermal contact with both the laser and the locker etalon,

wherein the thermal connection between the case and the locker etalon is configured to maintain a substantially constant difference in temperature between the laser and the locker etalon over a pre-defined range of case temperatures.

19. A method for thermal management of a locker etalon positioned within a case of a transmitter optical subassembly (TOSA), the method comprising the following acts:

in the TOSA that includes the locker etalon and a laser both in thermal contact with a single thermoelectric cooler (TEC) positioned within the case, thermally connecting the locker etalon to the case via at least one or more wire bonds;

while operating the TOSA over a pre-defined range of case temperatures, determining the differences in temperature between the laser and the locker etalon over the pre-defined range of case temperatures;

> determining that the differences in temperature between the laser and the locker etalon over the pre-defined range of case temperatures are not substantially constant; and
>
> modifying the number of wire bonds that are thermally connecting the locker etalon to the case.

The Examiner relies on the following prior art in rejecting the claims:

| | | |
|---|---|---|
| Yamauchi et al. | US 2001/0033592 Al | Oct. 25, 2001 |
| Fang et al. | US 6,556,752 B2 | Apr. 29, 2003 |
| Kleinschmidt | US 6,667,804 B1 | Dec. 23, 2003 |
| Mazed | US 2004/0004980 Al | Jan. 8, 2004 |
| McCallion et al. | US 2008/0187325 Al | Aug. 7, 2008 |
| Hosking et al. | US 2009/0122493 Al | May 14, 2009 |

Claims 1–3[2] and 6–8 stand rejected under 35 U.S.C. § 103(a)[3] as being unpatentable over Mazed, Yamauchi et al. (hereinafter "Yamauchi"), Kleinschmidt, and Fang et al. (hereinafter "Fang"). *See* Final Act. 7–10.

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Mazed, Yamauchi, Kleinschmidt, Fang, and McCallion et al. (hereinafter "McCallion"). *See* Final Act. 10–11.

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[2] Appellants label claim 2 as "[**c**]**ancelled**" in the Claims Appendix. App. Br. 20. However, both Appellants and the Examiner treat claim 2 as pending, rejected, and on appeal. *See, e.g.*, App. Br. 3, 6; Final Act. 1, 7, 9. Accordingly, we treat the labelling of claim 2 in the Claims Appendix as a clerical or typographical error, so that the rejection of claim 2 is before us.

[3] All rejections are under the provisions of 35 U.S.C. in effect prior to the effective date of the Leahy-Smith America Invents Act of 2011. *See, e.g.*, Final Act. 6 ("pre-AIA").

Claims 5, 10–12, and 14–17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mazed, Yamauchi, Kleinschmidt, Fang, and Hosking et al. (hereinafter "Hosking"). *See* Final Act. 11–14.

Claim 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mazed, Yamauchi, Kleinschmidt, Fang, Hosking, and McCallion. *See* Final Act. 14–15.

Claims 19 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fang, Kleinschmidt, and Yamauchi. *See* Final Act. 15–17.

Rather than repeat the arguments here, we refer to the Briefs ("App. Br." filed Nov. 4, 2015; "Reply Br." filed June 6, 2016) and the Specification ("Spec." filed Sept. 27, 2011) for the positions of Appellants and the Final Office Action ("Final Act." mailed June 11, 2015) and Answer ("Ans." mailed Apr. 15, 2016) for the reasoning, findings, and conclusions of the Examiner. Only those arguments actually made by Appellants have been considered in this decision. Arguments that Appellants did not make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(iv) (2015).

## ISSUES

Based on Appellants' arguments, we discuss the appeal by reference to claims 1 and 19. The issues presented by Appellants' arguments are as follows:

Does the Examiner err in finding that the combination of Mazed, Yamauchi, Kleinschmidt, and Fang teaches or suggests "a thermoelectric cooler (TEC) positioned within the case and in thermal contact with both the

laser and the locker etalon" (hereinafter the "thermal contact limitation"), as recited in claim 1?

Does the Examiner err in finding that the combination of Mazed, Yamauchi, Kleinschmidt, and Fang teaches or suggests "the thermal connection between the case and the locker etalon is configured to maintain a substantially constant difference in temperature between the laser and the locker etalon over a pre-defined range of case temperatures" (hereinafter the "constant difference limitation"), as recited in claim 1?

Does the Examiner err in finding that the combination of Fang, Kleinschmidt, and Yamauchi teaches or suggests "the TOSA that includes the locker etalon and a laser both in thermal contact with a single thermoelectric cooler (TEC) positioned within the case" (hereinafter the "single TEC limitation"), as recited in claim 19?

## ANALYSIS

### *Claim 1*

The Thermal Contact Limitation

Appellants contend the thermal contact limitation requires "a single TEC that is 'in thermal contact with both the laser and the locker etalon.'" App. Br. 12–13 (citing Spec. ¶¶ 4, 23, 24, 29, 35, 39, 43). Appellants further contend that Fang does not teach a single TEC but rather teaches a TEC assembly comprising two complete TEC circuits. App. Br. 13–14 (citing Fang col. 1, ll. 65–67, col. 2, ll. 46–47, col. 3, ll. 32–52, Fig. 5). We are not persuaded of Examiner error for at least two reasons.

First of all, we do not agree that the broadest reasonable interpretation of the thermal contact limitation as recited in claim 1 is limited to a single TEC. Our reviewing court

> ["]has repeatedly emphasized that an indefinite article 'a' or 'an' in patent parlance carries the meaning of 'one or more' in open-ended claims containing the transitional phrase 'comprising.'" *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1356 (Fed. Cir. 2000). That "a" or "an" can mean "one or more" is best described as a rule, rather than merely as a presumption or even a convention. The exceptions to this rule are extremely limited: a patentee must "evince[ ] a clear intent" to limit "a" or "an" to "one." *Id.*

*Baldwin Graphic Systems, Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1342 (Fed. Cir. 2008). No such clear intent is evinced here. Indeed, where Appellants intend to limit a similar claim recitation to a single TEC, Appellants explicitly recite "a *single* thermoelectric cooler (TEC)" (App. Br 23 (Claims App'x, claim 19) (emphasis added)).

Secondly, Appellants' argument does not address the rejection articulated by the Examiner. The Examiner relies on Mazed, not Fang, to teach the thermal contact limitation of claim 1. *See* Final Act. 7 (citing Mazed ¶¶ 53–54, Fig. 1).

The Constant Difference Limitation

Appellants contend as follows:

> [A]ccording to [the constant difference limitation of] claim[] 1 . . . , the substantially constant difference in temperature between the laser and the locker etalon is maintained by the thermal connection between the case and the locker etalon. Insofar as *Fang* does not appear to teach any thermal connection at all between the locker 70 and a case of the package 45 and insofar as *Fang* appears to teach that the difference in temperature between the laser 50 and the locker 70 is maintained by

> independently operating TEC1 80 and TEC2 82, *Fang* therefore does not appear to teach "**wherein <u>the thermal connection</u> between the case and the locker etalon <u>is configured to maintain a substantially constant difference in temperature</u> between the laser and the locker etalon over a predefined range of case temperatures**," as recited in claim[] 1 . . . .

App. Br. 9.

We are not persuaded of error. The Examiner finds the combination of Mazed, Yamauchi, and Kleinschmidt teaches all of the specific structural limitations of claim 1 (Final Act. 7–8 (citing Mazed ¶¶ 28, 32, 53–54, Fig 1 (items 11, 21, 13); Yamauchi ¶¶ 6, 24, 47–48, 59–60, Fig 5B (items 1C, 9); Kleinschmidt col. 14, l. 60–col. 15, l. 2, Fig. 2a (item 34))), but does not teach the constant difference limitation (Final Act. 8). The Examiner finds Fang teaches the desirability of "<u>maintain[ing] a substantially constant difference in temperature between the laser and the locker etalon over a pre-defined range of . . . temperatures</u>." (*Id.* (citing Fang col. 3, ll. 32–52, col. 4, ll. 23–35, Figs. 5 (items 50, 70), 6)). The Examiner then concludes it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the structural elements taught by the combination of Mazed, Yamauchi, and Kleinschmidt to configure the thermal connection between the case and the locker etalon taught by Yamauchi (*see* Final Act. 7) to "maintain a substantially constant difference in temperature between the laser and the locker etalon over a pre-defined range of case temperatures," as recited in claim 1. *Id.* at 8–9.

Courts have generally interpreted "configured to" more narrowly than simply "capable of." *See Typhoon Touch Technologies, Inc. v. Dell, Inc.*, 659 F.3d 1376, 1380 (Fed. Cir. 2011) (construing "memory … configured to" as "memory that must perform the recited function"); *see also Aspex*

*Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d 1335, 1349 (Fed. Cir. 2012) (interpreting "adapted to" and construing it in the "narrow" sense of "configured to" in contrast to the "broader" sense as "capable of"); *Sta–Rite Indus., LLC v. ITT Corp.*, 682 F.Supp.2d 738, 753 (E.D. Tex. 2010) (construing "adapted to," in context, to mean "designed or configured to," not "'having the capacity to'"); *Boston Scientific Corp. v. Cordis Corp.*, 2006 WL 3782840 (N.D. Cal. Dec. 20, 2006) (construing "adapted to," in light of patent as a whole, to mean "configured to," not "capable of"). Accordingly we give the constant difference limitation full patentable weight as a requirement of the claim. That said however, the claim does not recite any specific limitations regarding the pre-defined range of case temperatures or the nature of the configuration of the thermal connection between the case and the locker etalon.

Appellants' invention is based on the recognition that for some pre-defined range of case temperatures and configuration of the thermal connection between the case and the locker etalon, the difference in temperature between the laser and locker etalon will be maintained substantially constant. *See, e.g.,* Spec. ¶ 26. However, "[t]he fact that [Appellants have] recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious." *Ex parte Obiaya*, 227 USPQ 58, 60 (BPAI 1985) (*referencing In re Best*, 562 F.2d 1252 (CCPA 1977) and *In re Wilder*, 429 F.2d 447 (CCPA 1970)).

Here the Examiner has established that it would have been obvious to combine Mazed, Yamauchi, and Kleinschmidt to create the structure defined by claim 1, except for the constant difference limitation. The Examiner has

implicitly, but reasonably, presumed that in such a structure, the configuration of the thermal connection would cause the difference in temperature between the laser and the locker etalon to be maintained substantially constant over *some* pre-defined range of case temperatures, which Fang suggests is a desirable property of the structure. *See generally* Ans. 15–16; *see also* Spec. ¶ 4 ("[A] single TEC is *sometimes* ineffective at simultaneously regulating the temperatures of multiple internal components." (emphasis added)). In other words, the Examiner has established a prima facie case of obviousness with regard to claim 1, including the constant difference limitation; Appellants have not pointed to any evidence in the record that rebuts the Examiner's prima facie case.

Appellants further contend as follows

> One of ordinary skill in the art at the time of the invention would not have modified *Mazed's* wavelength locked semiconductor laser or laser array module to include *Fang's* TEC assembly with two independently-controlled TEC circuits 15 and 17 as doing so would increase the size of *Mazed's* wavelength locked semiconductor laser or laser array module.

App. Br. 11. We find this argument unpersuasive because, as pointed out by the Examiner, "this argument is based upon a modification that was simply not made [by] the Examiner" (Ans. 16–17 (emphasis omitted)).

Summary

Appellants do not persuade us of error in the rejection of claim 1. Accordingly, we sustain the rejection of (1) claim 1; (2) independent claim 10, which was argued together with claim 1; and (3) claims 2–8 and 11–17, which depend from claims 1 and 10, respectively, and were not separately argued with particularity.

*Claim 19*

The Examiner relies on Fang to teach the single TEC limitation recited in claim 19. Final Act. 15 (citing Fang col. 1, ll. 65–67, col. 2, ll. 36–55, Fig. 5). The Examiner maps the recited "single thermoelectric cooler (TEC)" to Fang's TEC1 (Fang Fig. 5, item 80) and TEC2 (*id.*, item 82).[4] Final Act. 15. The Examiner explains that in the absence of a special definition of the phrase in the Specification, the broadest reasonable interpretation of a "single thermoelectric cooler" encompasses a single TEC assembly having two TEC circuits fabricated on the assembly. *See* Ans. 21–22 (citing Fang col. 1, ll. 65–67, col. 2, ll. 36–55, Fig. 5).

Appellants contend as follows:

> [I]n contrast to claim 19, *Fang* teaches a laser 50 on TEC1 80 and a locker 70 on a different TEC2 82. *Fang* does not appear to teach that the laser 50 and the locker 70 are in thermal contact with the same TEC; rather each is in thermal contact with a different TEC. . . .
>
> . . . [A] single multi-TEC assembly is simply not equivalent to a "single thermoelectric cooler" as recited in claim 19. . . . [T]he broadest reasonable interpretation of the term "single thermoelectric cooler" includes a single TEC circuit.

App. Br. 17.

We agree with Appellants for the reasons stated by Appellants. We conclude the Examiner's claim construction is unreasonably broad. The ordinary meaning of the adjective "single" is "**3 a** (1) : consisting of or having only one part, feature, or portion . . . (2) : consisting of one as

[4] We note, in passing, that the Examiner does not rely on the teachings of Mazed in rejecting claims 19 and 20. *See* Final Act. 15. Nor does the Examiner rely on Kleinschmidt or Yamauchi to teach the single TEC limitation. *See* Ans. 22–23 (responding to App. Br. 18–19).

opposed to or in contrast with many . . . (3) : consisting of only one in number." MERRIAM WEBSTER'S COLLEGIATE DICTIONARY 1095 (10th ed. 1999). In other words, the ordinary meaning of "single" is one and only one. The Examiner's claim construction reads the word "single" out of the claim. For example, under the Examiner's claim construction, if two previously separate TECs were assembled into a TOSA, they would become a "single thermoelectric cooler" by virtue of being included in the same TOSA assembly. We conclude a "single thermoelectric cooler" is one and only one TEC circuit. We agree with Appellants that an assembly of multiple TECs is not "a single thermoelectric cooler (TEC)" as recited in claim 19.

Appellants persuade us of error in the rejection of claim 19 as articulated by the Examiner. Accordingly, constrained by the record before us, we do not sustain the rejection of claim 19 and claim 20, which depends from claim 19.

## DECISION

The decision of the Examiner to reject claims 1–8 and 10–17 is affirmed.

The decision of the Examiner to reject claims 19 and 20 is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1). *See* 37 C.F.R. §§ 41.50(f), 41.52(b).

AFFIRMED-IN-PART